"HANUMAN GANGA HYDRO (4.95 MW) PLANT AT UTTARAKHAND"

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Summary:

The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project. The verification is based on the Validated VCS PD[/VCS-PD/], Final validation report of VCS[/FVR/], Monitoring report[/MR/], supporting emission reduction calculation sheet[/XLS/] and other supporting documents made available to the verifiers by the project proponent.

The proposed project activity by M/s.Regency Aquaelectro & Motelresorts Ltd. is a run-of-the river hydro power plant with a total installed capacity of 4.95 MW involving 3 hydro turbines for electricity generation on Hanuman Ganga Nallah in Uttarkashi District, Uttarakhand State of India. The project activity uses potential energy of the flowing stream due to natural river bed fall. The electricity thus produced is exported from this small hydroelectric power plant to Uttarakhand Power Corporation Limited (UPCL) through the integrated North East West and North Eastern (NEWNE) regional grid of India.

In the course of the verification 05 Corrective Action Requests (CARs) and1 Clarification Request (CL) was raised. No Forward Action Request (FAR) was raised.

As a result of the verification, the verifier confirms that:

- All operations of the project are implemented and installed as planned and described in the project document [/PDD/, /CAL/, /CC/]. The installed equipment essential for generating emission reductions runs reliable.
- The monitoring plan is in accordance with the applied approved CDM methodology AMS I.D, Version 13
- The installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately except some Meters where respective state utility has missed the calibration schedule for which EB 52 Annex 60 was applied for conservative emission reduction calculations
- The monitoring system is in place and functional. The project has generated GHG emission reduction and the emission reduction from the project activity is real, credible and long term for the monitoring period [/JMR/]
- GHG emission reductions are calculated without any material misstatements in a conservative and appropriate manner.

Also, all the documents checked during on-site visit and verification process will be kept confidential and will not be disclosed at any time other than the project proponent consent or as required by VCSA.

Reporting period: **From 28/03/2006 to 31/03/2010 (incl. both days)**

Verified GHG emission reductions or removals in the above reporting period:

GHG Emission Reductions or Removals	**tCO_2e**
Baseline Emissions	**51,894**
Project Emissions	0
Leakage	0
Net GHG emission reductions or removals	**51,894**

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1 INTRODUCTION

1.1 Objective

The objective of the verification is the review and ex-post determination by an independent entity of the GHG emission reductions. It includes the verification of the:

- implementation and operation of the project activity as given in the VCS PD /VCS PD/,
- compliance with applied approved methodology and the provisions of the monitoring plan,
- data given in the monitoring report by checking the monitoring records, the emissions reduction calculation and supporting evidence,
- accuracy of the monitoring equipment,
- quality of evidence,
- Significance of reporting risks and risks of material misstatements.

1.2 Scope and Criteria

The 1st periodic verification of this registered project is based on the validated project design document /VCS PD/, the monitoring report /MR1,MR2/,/MR3.1/,/MR3.2/, emission reduction calculation spread sheet /XLS1, XLS2/, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The verification is carried out on the basis of the following requirements, applicable for this project activity:

- Article 12 of the Kyoto Protocol /KP/,
- VCS Version 03 requirements
- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1 /MA/, and subsequent decisions made by the Executive Board and COP/MOP,
- other relevant rules, including the host country legislation,
- CDM Validation and Verification Manual /VVM/,
- monitoring plan as given in the Validated PD /PD/,
- Approved CDM Methodology AMS I.D – Grid connected renewable electricity generation (Version 13)

1.3 Level of assurance

The verification report is based on Validated PD/PD/, /, Monitoring report/MR1/, /MR2/,/MR3.1/,/MR3.2/ and Final Validation report/FVR/, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification opinion is assured provided the credibility of all above.

1.4 Summary Description of the Project

The project activity by Regency Aquaelectro & Motelresorts Ltd. is a run-of-the river hydro power plant with a total installed capacity of 4.95 MW involving 3 hydro turbines for electricity generation on Hanuman Ganga Nallah in Uttarkashi District, Uttarakhand State of India. The project activity uses potential energy of the flowing stream due to natural river bed fall. The electricity thus produced is exported from this small hydroelectric power plant to Uttarakhand Power Corporation Limited (UPCL) through the integrated North East West and North Eastern (NEWNE) regional grid of India. The project was scheduled to be implemented in two phases. Out of the 4.95 MW, phase I i.e. 3.0 MW plant (2 x 1.5 MW) was commissioned on 2005-03-24[/CC/] and phase II i.e. 1.95 MW was commissioned on 2008-04-19[/CC/]. The project was applied under CDM mechanism, however due to the internal reason project promoter has not decided to go under CDM mechanism and the project has been terminated.

The sum of the output capacity of project activity i.e. the hydro turbine generators does not exceed the maximum output capacity limit for its type (i.e. renewable energy project activity with a capacity < 15 MW), hence this project activity qualify as a small scale as per CDM guidelines. The project activity utilizes Francis type hydro turbines and synchronous alternators with automatic voltage regulator and static brushless excitation to the grid.

Table 1-1: Technical data of the project

Description	**1.5 MW X 2**	**1.95MW**
Length of Power Tunnel (m)	1380	1380
Design Discharge of Power Tunnel (cumec)	2.65	1.51
Design Discharge of Penstock (cumec)	2.3	1.5
Design Head (m)	155	155
Turbine	**1.5 MW X 2**	**1.95MW**
Make	Sulzer Flovel Hydro Ltd.	VA Tech Escher Wyss Flovel Ltd.
Type	Francis	Francis
Axis	Horizontal	Horizontal
Number	2	1
Efficiency at rated load (%)	91.9	92.6
Output at Max. Head of 154 M (KW)	1580	1950
Rated Speed (rpm)	1500	1500

Runaway Speed (rpm)	2712	2712
Turbine Discharge(Full Load) (cumec)	1.141	1.323
Alternator		
Make	Crompton Grieves	Toyo Denki Seizo
Phase	3	3
Connections	Star	Star
Poles	4	4
Rated Speed (rpm)	1500	1500
Capacity (KVA)	1765	2294
Terminal Voltage (KV)	3.3	3.3
Power Factor	0.85	0.85
Rated Current (Amperes)	309	401
Frequency (Hz)	50	50
Excitation Voltage (Volts)	63	106
Excitation Current (Amperes)	350	213

Table 1-2: Project Characteristics

Item	Data
Project title	Hanuman Ganga Hydro (4.95 MW) Plant at Uttarakhand
Project owner	Regency Aquaelectro & Motelresorts Ltd.
Any specific project categories	☐ Mega project (> 10^6 t CO_{2eq} / a) ☐ Micro project (< 5000 t CO_{2eq} / a) ☐ AFOLU project ☐ Grouped project ☒ No specific project category
VCS PD dated	15/11/2009

VCS reference	VCU Validation Statement dated 18/11/2009 (Ref. No. 53707108-08/461)
Applied Methodology	AMS I.D – Grid connected renewable electricity generation (Version 13)
Project starting date	24/03/2005
Crediting period	☒ Renewable Crediting Period (10 years)
Start of crediting period	2006-08-28

Project Location

The details of the project location are given in table 1-3-A and table 1-3-B:

Table 1-3-A: Project Location

Details	Project Location
Host Country	India
Region:	Uttarakhand
Project location address:	District Uttarkashi, Village-Hanuman Chatti
Latitude:	30º 55´ 50“ N
Longitude:	78º 24´ 20“ E

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

NA

2.2 Validation Findings

2.2.1 Gap Validation

NA

2.2.2 Methodology Deviations

NA

2.2.3 New Project Activity Instances

NA

2.3 Validation Conclusion

NA

3 VERIFICATION PROCESS

The project is registered under VCS version 2007.1 (i.e. version 02)) and the present verification is 1st periodic verification.

3.1 Method and Criteria

The verification of the project was carried out from December 2010 to September 2011

Topic	Time
Assignment of verification	2008-11-27
On-site visit	2010-04-08
Draft reporting finalised	2010-10-11
Technical review on draft reporting finalised	2010-10-11
Final reporting finalised	2012-03-19
Technical review on final reporting finalised	2012-06-06
Final corrections	2012-06-08

The verification consists of the following steps:

- A desk review of the VCS-PD/VCS PD/and supporting documents with the use of the relevant sections according to the VCS version 03 was undertaken;
- Desk review of the Monitoring Report/MR1,2,3.1,3.2/ submitted by the client and additional supporting documents.;
- Verification audit planning;
- On-Site assessment;
- Background investigation
- Follow-up interviews with personnel of the project developer and
- Verification reporting (Draft Verification Report and Final Verification Report)

The criteria of this verification include the relevant rules and steps as set out in the VCS version 03.

3.2 Document Review

The submitted MR/MR1,2,3.1,3.2/ and supporting background documents related to the project design and monitoring were reviewed.

Furthermore, the assessment team used additional documentation by third parties like host party legislation, QA/QC procedures, technical reports referring to the project design or to the basic conditions and technical data.

3.3 Interviews

The assessment team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for VCS.

3.4 Site Inspections

During verification the verification team has performed site visit and interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 1.

Table 1: Interviewed persons and interview topics during the verification site visit

Interviewed Persons / Entities	**Interview topics**
Representatives from 1. Project proponent – Regency Aquaelectro and Motel resorts Ltd. 2. Consultants – Gensol Consultants Pvt. Ltd.	- General aspects of the project - Technical equipment and operation - Changes since validation - Monitoring and measurement equipment - Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - GHG calculation - Procedural aspects of the verification - Maintenance - Environmental aspects - Editorial issues of the Monitoring Report

3.5 Resolution of Any Material Discrepancy

1. **Definition: A Corrective Action Request (CAR) will be established where:**

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the first verification.

2. **Draft Verification Report**

After reviewing all relevant documents and taken all other relevant information into account, the assessment team issues all findings in the course of a draft verification report and hands this report over to the project proponent in order to respond on the issues raised and to revise the project documentation accordingly.

3. **Final Verification Report**

The final verification starts after issuance of the proposed corrective action (CA) of the CARs CLs and FARs by the project proponent. The project proponent has to reply on those and the requests are “closed out” by the assessment team in case the response is assessed as sufficient. In case of raised FARs the project proponent has to respond on this, identifying the necessary actions to ensure that the topics raised in this finding are likely to be resolved at the latest during the subsequent verification. The assessment team has to assess whether the proposed action is adequate or not.

In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive validation opinion can be issued by the assessment team.

The CAR(s) / CL(s) / FAR(s) are documented in chapter 4 below.

4. **Technical review**

Before submission of the final verification report a technical review of the whole verification procedure is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the validation team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the verification opinion and the topic specific assessments as prepared by the verification team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

5. Final approval

After successful technical review of the final report an overall (esp. procedural) assessment of the complete verification will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The proposed project activity by M/s Regency Aquaelectro & Motelresorts Ltd. is a small-scale project activity involving installation of 3 hydro based turbine generators of 4.95 MW as total capacity. The project activity is located in Hanuman Chatti village, Uttarkashi district of Uttarakhand. The electricity generated is fed to the NEWNE regional electricity grid in India through UPCL.

The assessment team found that the project has been implemented/IM01, 02/ as described in the VCS PD/VCS PD/. There are no changes in the installed key equipment since the project inception (refer section 1.4 for more details).

Commissioning Details of the Turbine

Turbine Capacity	Commisioning Date
1.5 MW X 2	2005-03-24
1.95 MW	2008-04-19

The project revenue is based on the net units of electricity exported to the grid as measured by metering system involving the dedicated energy meters maintained by UPCL for the project activity. The monitoring of electricity exported to the grid is done through these meters which consist of main meter (primary) and check meter (secondary). The assessment team also noted that the accuracy of the main meter and check meter could be checked by comparing with each other.

All necessary monitoring instruments are installed. The joint measurement is carried out once in a month in presence of both parties (PP's representative and officials of the UPCL). The JMRs are cross checked using the invoices raised by PP on a monthly basis againgst the electicity sold to UPCL.and found OK. The monthly JMR is carried out for each month, thus for the period from 28/03/2006 to 31/03/2011 the data for the three day period is not available seperately. Thus the PP is not claiming any emission reduction for the three day period which is assessed to be appropriate and conservative approach. In addition the downtime of the project activity is described under Annexure-2 of this report.

The reporting/MR2/ is in line with the requirements of the validated monitoring plan/VCS PD/ which was prepared in line with the applied and approved consolidated methodology AMS I.D version 13. In conjunction with the project activity, VCS approved monitoring method is applicable for monitoring of "Net Electricity exported to the grid".

The reporting procedures reflect the requirements of the monitoring plan/VCS PD/.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Monitoring Report	**4.1.1**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	PP needs to clarify the inclusion of the entity *"Eastern Condiments (P) Ltd."* as mentioned under section 1 of MR which is not as per section 1.15 of the VCS PD.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The mentioned entity is not involved in the project activity. It was a typographical error. Hence, its name has been removed. The right PPs name has been further added - M/s Regency Aquaelectro & Motel resorts Ltd.		
DOE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The revised version (version-02) of monitoring report has been reviewed by assessment team the name of the project promoter (entity) is in line with the section 1.15 of VCS PD (Version – 2009-08-09). CL is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Monitoring Report	**4.1.2**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	During the MR and Document review, details of the downtimes , running hours and reason for downtime are missing PP needs to specify in MR the status of implementation of the project activity w.r.t the description of the project activity as provided in the registered VCS PD and about any changes/modification in the plant equipment		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	1. Section stating the downtime hours and running hours has been included in the section 2. 2 a. Status of implementation of the project activity has been included. 2b. No change/modification has been done in the plant equipment and the same is also included in the MR.		
DOE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In*	1. The operational data described is yearly, which cannot be treated as transparent. It should also provide the monthly breakup of the runtime and downtime data in line with the		

Monitoring Report	4.1.2
case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	reported documents to the management. 2. Status of the project activity has been included and verified from the commissioning certificates/CC/ and log books/LOG/, ok. During the site visit assessment/IM01/ it was verified that no changes have occurred in the key plant equipment as well as monitoring equipment s, the same has been included in the MR/MR2/, ok.
Corrective Action #2 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	1. The operational data is now described monthly. In section 2.1 of the revised MR the monthly breakup of the runtime and downtime data has been included and found in line with plant log books. Scanned copy of Plant log book has been made available to DoE.
DOE Assessment #2 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	*Monthly break up of operation data including downtime and running time of Plant has been provided in section 2 of revised MR/MR3.1/* (version 3.1) *of monitoring report. Also the plant log sheets showing break down hours and running hours have been made available to the assessment team. During onsite visit it was observed that daily meter reading (including downtime as well) are monitored and recorded by shift in charge in accordance with section 3.3 of revised PD. the same has been verified by provided data.* *The reason for downtime is not stated*
Corrective Action #3 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	*Reasons for downtimes have now been brought out in the relevant table of revised MR*
DOE Assessment #3 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	*Furthermore, assessment team has reviewed the section 2.1 of the Revised MR (Version 3.2), the reason of the down time mentioned in the section is in-line with the Actual site visit interviews and discussion , further assessment team also checked the Grid fail details/GFR/ Register and daily logbook/LOG/ for the confirmation on downtime details. Hence CAR Closed*
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Monitoring Report	4.1.3		
Classification	☒ CAR	☐ CL	☐ FAR

Monitoring Report	4.1.3
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The definition of EG_y is not consistent in various sections of MR as well as ER sheet. Furthermore, Section 3.4 of MR does not define the recording frequency of the parameter EG_y. Moreover, under section 4.2 of MR, the import of electricity as well as auxiliary electricity used by the plant are described to be same, which, does not correct and in line with the actual site conditions. Corrections requested. Overall, The MR and ER sheet referring to the VCS PD for all the parameters identified in the project activity lacks the parameter consistency. In additionthe export & imports values for the month of December 2007 are not in line with the JMR and Plant Data. Corrections requested.
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The definition of EG_y is now consistent in various sections of MR and ER. The JMRs for the monitoring period has been submitted and the plant logbooks has also been verified during the verification site visit, the scanned copy of plant logbooks has been made available to DoE. Section 4.2 of the MR has been changed accordingly. Import of electricity and auxiliary electricity are different parameters and the same is included in the MR Parameter consistency in the MR, ER and VCS PD has been checked and corrected accordingly. Also, the material mistaken for the export and import electricity values have been checked and corrected accordingly.
DOE Assessment #1 *The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Assessment team had rowed the section 3.4 of Revised MR /MR-2/ (version 2) the description of the Parameter EG_y is found in line with the VCS PD /VCS PD/ Assessment team has reviewed the section 3.4 of the Revised MR/MR-2/ (version 2) recording frequency (monthly)for parameter EG_y is now in line with the VCS PD /VCS PD/ further more assessment team also checked the monthly JMR and Logbook for confirmation of the mentioned recording frequency Verification team has checked the section 3.4 of revised MR/MR-2/ (version 2 and found import of electricity as well as auxiliary electricity used by the plant is described different. "electricity generated minus auxiliary electricity) minus electricity imported from the NEWNE grid," During the assessment, assessment team has checked the Revised MR/MR-2/ Revised ER Worksheet (version 2) parameter used are

Monitoring Report	4.1.3
	consistent in both Revised MR and Revised ER Worksheet Parameter consistency in the MR[/MR2/] and the ER sheet[/XLS2/] has been verified from the VCS PD[/VCS PD/] and is now clear, Hence CAR Closed
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The project participant 'M/s Regency Aquaelectro & Motelresorts Ltd..' is Project promoter for this project activity for all purposes related to Emission Reduction.

The project has been implemented as described in the VCS PD[/VCS PD/]. There are no major changes in the key equipment since VCS validation[/VAL/]. The same was confirmed during the site visit for the project activity.

The "Net Electricity exported to the grid" during the monitoring period 01/04/2006 to 31/03/2010 (including both days) was verified to be 64.628[/MR2//XLS/] GWh. This was verified by the assessment team during the on site visit by checking the recorded generation data which is maintained by the O & M contractor at the central monitoring station, common bulk meter reading reports signed by the UPCL personnel obtained by the common bulk meters, transparent working to trace the values arrived in JMR in line with the procedure stated in the registered VCS PD[/VCS PD/].

All required equipment and procedures are available (refer section 3.3) and implemented in an appropriate manner and there is no exchange of the equipment during the monitoring period. The submitted monitoring report which forms the basis of the verification was prepared by summarizing consolidated monthly data over the whole monitoring period in accordance with the monitoring plan of the registered VCS PD[/VCS PD/] under VCS 2007.1.

As emission reductions from the project is determined by the number of net electricity units exported to the grid. The exported energy will be metered by UPCL at the high voltage side of the step up transformers

The import and export readings of the main as well as check meter are recorded every month in the presence of authorized representatives from both the power producing company i.e. PP and power purchasing company i.e. UPCL. These figures provide the quantum of electricity imported, exported and hence net electricity exported to the grid.

During site visit, the assessment team through interviews[/IM01,02/] checked and confirmed that the "Joint Meter Reading Reports" are generated from the the installed electricity meters (main and check meter) every month and signed by authorised officials representing PP and UPCL. The assessment team also assessed the Procedure for measurement method for electricity as stated in the Validated VCS PD under VCS[/VCS PD/] is found the working to be accurate as per described in Validated VCS PD. The DOE

further cross verified the JMR and the invoices[/JMR/] raised by the project proponents to State electricity Board and deemed the same as OK.

☒ The project complies with the requirements.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Description

Simplified Modalities and Procedures for Small-Scale CDM Project Activity, Category I.D. are applied to the project activity.

The approved methodology AMS I.D version 13 is applicable to the project activity. The emission coefficient was calculated ex-ante in the VCS PD in accordance with the requirements as laid down in the methodology, i.e. the emission coefficient is calculated in accordance with the requirements of Tool to calculate the emission factor for an electricity system, Version 01.1 and CO_2 Baseline Database for Indian Power Sector, version 4[/CEA/]. The emission coefficient is defined ex-ante under section 2.4 of VCS PD[/VCS PD/] with the value as 0.803 tCO_2/MWh.

"Net Electricity exported to the grid" (MWh) multiplied by an emission coefficient for the NEWNE regional electricity grid in India, calculated as weighted average emissions (in tCO_2e/MWh) are considered to be as the baseline emissions. As the project emissions and leakage emissions are 0, the baseline emissions alone account for the emission reductions due to project activity.

The calculation of baseline emissions involves two parameters—

1. Grid emission factor (EF_y, tCO_2/MWh) (Defined ex ante 0.803 tCO_2e/MWh)
2. Net Electricity exported to the grid (EG_y, MWh) (obtained from JMRs)

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	**4.2-1**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The monitoring period is not consistent and clearly defined in the MR as well as the ER sheet, correction requested. Furthermore, the estimated value of emission reductions as mentioned under section 2 of MR is incorrect w.r.t VCS PD.		

Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	Now, the monitoring period is consistent and clearly defined in the MR and ER sheet. The estimated value of emission reductions is corrected.
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	*The monitoring period is still not consistent in the ER sheet.* *The estimated ER value is still not consistent in the ER sheet. Furthermore, a comparison of estimated as well as achieved ERs and relevant justification also needs to be incorporated in the MR.*
Corrective Action #2 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The monitoring period and the estimated ER values has been corrected in the ER sheet and made consistent. A comparison of estimated as well as achieved ERs and relevant justification has been incorporated in the section 4.4 of MR.
DOE Assessment #2 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Monitoring period is corrected in ER sheet. It is in line with the section 3.2 of revised MR/MR/ (version 3.1). Hence issue closed. Comparison between estimated and achieved emission reductions has been included in section 4.4 of revised version (*version 3.1*) of monitoring report. Furthermore, the PPs have reasonably justified the difference occurred in estimated and actually achieved emission reductions. This was supported by the details of breakdown time in section 2 of revised monitoring report. Month wise data of breakdown time during verification period
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	**4.2-2**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	During site visit DG set was identified which could be attributable to the project activity and is likely to be used during grid failure. Please clarify		

Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The use of DG set is done in case of emergency grid failure only for the purpose of lighting for the control room as well as the living rooms for the power plant personnel. As the plant is at a very remote location and grid failures may be due to any reason, which disconnects grid totally from the plant. This has happened in the past as evident from the shut down details. Further, the DG set capacity is very low as seen by the DOE and kept out of the plant and not coupled to the hydro plant in any ways. Thus, the HSD usage in not significant and hence not a part of ER calculations. Project emissions account for only 0.01% of the total emission reductions, which is substantially less than 1% of the total emission reductions. Thus, the HSD usage in not significant and hence not a part of ER calculations.
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The details provided by the project promoter, the DG set is only for the lighting purpose, same was confirmed during the discussion with PP, the capacity of the same was verified during the site visit, Furthermore PP has provided separate excel sheet for calculation of HSD Project emission. The Project emission due HSD used for DG set is below 1% of the Project emission; hence it is not considered the ER calculations, however the consumption of HSD in DG sets are hence forth monitored and will be submitted to the verifying entity. Further the DG set is also included as part of project boundary. The inclusion of additional parameters ($\mathbf{EF_{diesel}}$, $NCV_{diesel,}$ (fixed) $FC_{\mathbf{Diesel}}$(monitored)) is accepted by the verifying DOE as it is in line with the VVM version 1.2 para 77. In addition, since the contribution of the emissions arising out of emissions from DG were negligible and well below 1 % (as evidenced during this monitoring period also the verification team accepts its exclusion inline with para 77 of VVM version 01.2. The revised monitoring plan is checked and is assessed to be OK. Hence CL Closed
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The assessment team ascertained that the emission reductions calculation is as prescribed in the baseline methodology as well as the approach described in the registered VCS PD[/VCS PD/]. The emission factor is defined ex-ante, the Combined Margin (in tCO_2e/MWh) of the prevailing generation mix of NEWNE regional electricity grid in India was used for the calculation of baseline. The weighted

average emission factor data calculated and provided by CO_2 Baseline Database for Indian Power Sector,, version-4 is used for the proposed project activity and it is calculated in a transparent and conservative manner under section 4.2 of the VCS PD/VCS PD/.

The assessment team checked the spread sheet/XLS/ programming in line with the logic of emission reductions calculation and application of monitored data, emission factor and found it consistent to the registered VCS PD/VCS PD/.

It was verified in the course of this verification that the above mentioned methodology has been correctly and accurately applied in calculating the total emission reductions and the emission reductions calculation is accurate and conservative.

The meters are calibrated by competent third party, as per the VCS PD once in every three years..Delayed calibration was observed for which project promoter has applied error factor of 0.5%. Calibration result was within the limit i.e. below 0.5% so according to the guidance para 4(a) EB 52 annex 60 PP has applied Maximum error of the meters i.e. 0.5 % for whole monitoring period as a conservative approach. It was verified in the course of this verification that the above mentioned methodology has been correctly and accurately applied in calculating the total emission reductions and the emission reduction calculation is accurate and conservative.

☒ The project complies with the requirements

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

Description

The allocation of responsibilities is documented in a written form and is followed as described in VCS PD/VCS PD/. Routines for the archiving of data are defined and documented as the assessment team found proper arrangement for collection, storage and retrieving of JMR and corresponding invoices/ORG/. Calculations are laid down in the monitoring report is in line with VCS PD/VCS PD/.

According to the monitoring plan decided in validated PDD The calibration test of the trivector energy meters was carried out once every three years but delayed Calibration was observed for the period, according to the Para 4 of Annex 60, EB 52, maximum error factor is applied for the whole period.

Table 3.3 Calibration Details

Meter	Type	Make	Accuracy Class/MF	Serial Number	Calibration Date	Calibrating Entity
Main	Trivector Energy Meter	L&T	0.5% / 100	06763268	15/02/11	UPCL
Check	Trivector Energy Meter	Secure	0.5% / 100	UPC00095	15/02/11	UPCL

Several other documents like calibration certificate/CAL/, Joint meter readings (JMR)/JMR/, invoice raised by PP to state electricity board. Were submitted by the project proponent as evidence to determine emission reductions. The evidences were assessed and found in line with the provisions of monitoring plan. Please also refer section 5.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	**4.3-1**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The MR fails to provide the Calibration details of various meters involved in the metering of EG_y during the entire monitoring period. Moreover the calibration of the monitoring equipment was not observed to have been performed as per the monitoring plan in VCS PD. Thus, in line with the Annex 60 of EB 52, the emission reductions need to be recalculated. Furthermore, the emergency preparedness procedure also needs to be included in MR as far as the monitoring is concerned.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	There was no calibration of meters during the entire monitoring period. Therefore, as per the Annex 60 of EB 52 the calibration of the meter has been done later on dated 14.02.2011 and it was found that the error in the calibration report was less then maximum permissible error. Hence as per the guidelines the emission reduction has been reduced. The same has been incorporated in the MR under section 4.2. A para explaining the emergency preparedness has been incorporated in section 4.2 of MR.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Referring to the calibration performed dated 2011-02-15/CAL/ and the ER sheet/XLS2/, as the error reported in the calibration certificate was less than 0.5 % (equivalent to maximum error allowed /accuracy class in the installed electricity meter)/CAL/, the conservative factor of 0.5 was applied in the ER calculations, which resulted in the reduction (by 0.5 %) of the exported electricity to the grid and increase (by 0.5 %) in the import values of electricity. During the site visit the PP confirmed that they will follow up with the SEB for in-time calibration during the future monitoring period.		

	Hence CAR Closed ok.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

During site visit interviews[/IM01,02/], the assessment team found competent staff employed by PP for the monitoring performance of the project. Furthermore, the assessment team found that the Chief Project officer reviews the PP's energy meter log books on a daily basis and maintain records for the monitored data in plant or at Head Quarters of RAML. The assessment team checked and found that on daily basis, a compilation of the energy data from the plant is recorded in the form of Daily Generation Report. The monthly consolidated report of the same and the invoices for sale of electricity to UPCL are used for cross-checking purposes. The documents were checked and found to be in order.

Further more during the site visit assessment team observe that the calibration of the monitoring equipment had not done according to the VCS PD[/VCS-PD/] . Furthermore Assessment team has observed that Calibration of the monitoring equipment was done on 2011-02-15[/CAL/]. Same was reviewed by the assessment team. Considering the delayed calibration. Project Promoter has applied the error factor of 0.5 % as per the Annex 60 of EB 52 to whole Monitoring period.

☒ The project complies with the requirements

4.4 Management and Operational System

Description

The management and operational system of the project is as per the validated PDD. During the site visit interviews, the assessment team checked the training procedures of the plant personnel and assessed the competency of the responsible people and deemed OK[/CT/]. The allocation of roles and responsibilities was also assessed and found to be sufficient[/ORG/].
An operational structure has been established with responsibilities clearly identified and documented in the VCS PD[/VCS PD/]. The management and operational system was assessed during the site visit and found OK. The procedures for obtaining the JMR and day to day monitoring of the plant operations was confirmed during the site visit interviews[/IM01,02/] and actual check of JMR for every month. Also refer to Section 3.5 of this report.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

All the management operational procedures are in place as per the registered VCS PD[/PD/]. The archiving of the data is both in electronic and paper format and is in line with the VCS PD[/PD/].

No CAR/CLs are raised.

5 VERIFICATION CONCLUSION

The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project. The verification is based on the Validated PD[/PD/], Final validation report[/FVR/], Monitoring Report[/ MR1,2,3.1,3.2/], supporting emission reduction calculation sheet[/XLS1/, /XLS2/] and other supporting documents made available to the verifiers by the project proponent.

As a result of the verification, the verifier confirms that:

- All operations of the project are implemented and installed as planned and described in the project document. The installed equipment essential for generating emission reductions runs reliable.
- The monitoring plan is in accordance with the applied approved CDM methodology AMS I.D – Grid connected renewable electricity generation (Version 13)
- The installed main and check meters for monitoring parameter "Net electricity exported to the grid" required for calculating emission reductions are calibrated by Uttarakhand Power Corporation Limited however the meters were not calibrated inline with the specified frequency of monitoring plan and accordingly EB 52 Annex 60 was applied for conservative emission reduction calculations.
- The monitoring system is in place and functional. The project has generated GHG emission reduction and the emission reduction from the project activity is real, credible and long term for the whole crediting period.
- GHG emission reductions are calculated without any material misstatements in a conservative and appropriate manner.

Also, all the documents checked during on-site visit and verification process will be kept confidential and will not be disclosed at any time other than the project proponent consent or as required by VCSA.

Reporting period: From 28-03-2006 to 31/03/2010 (incl. Both days)

Verified GHG emission reductions or removals in the above reporting period:

S. No.	Year	Emission Reductions (tCO_2)
1	2006	11019
2	2007	12057
3	2008	13013
4	2009	13724
5	2010	2081

6	**Total Emission Reductions**	**51894**

GHG Emission Reductions or Removals	tCO_2e
Baseline Emissions	51,894
Project Emissions	0
Leakage	0
Net GHG emission reductions or removals	51,894

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Final approval
Essen, 2012-06-08

Annexure 1

Abbreviations

BAU	Business as usual
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
CP	Certification Program
CL	Clarification Request
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
MW	Mega Watt
QC/QA	Quality control/Quality assurance
RAML	Regency Aquaelectro & Motelresorts Ltd.
UNFCCC	United Nations Framework Convention on Climate Change
UPCL	Uttarakhand Power Corporation Limited
VCS	Voluntary Carbon Standard
VCS PD	VCS - Project Description
VCU	Voluntary Carbon Unit
VVM	Validation and Verification Manual

Annexure 2

Table 1: Details Running & Downtime Hours/GFR/

Period	Downtime Hours	Dominant Reasons for downtimes	Running Hours
2006			
01.04.2006 - 30.04.2006	107.07	Rostering	612.53
01.05.2006 - 31.05.2006	85.03	Earth fault	634.57
01.06.2006 - 30.06.2006	34.36	Earth fault	685.24
01.07.2006 - 31.07.2006	111.31	Earth fault	608.29
01.08.2006 - 31.08.2006	83.2	Earth fault	636.58
01.09.2006 - 30.09.2006	19.11	Earth fault	700.49
01.10.2006 - 31.10.2006	26.57	Under Voltage	693.03
01.11.2006 - 30.06.2006	81.58	Rostering	638.02
01.12.2006 - 31.12.2006	40.18	Earth fault and Rostering	679.42
2007			
01.01.2007 - 31.01.2007	117.25	Due to breaking of 33KV transmission line	602.35
01.02.2007 - 28.02.2007	113.12	breaking of transmission line and Rostering	606.48

01.03.2007 - 31.03.2007	51.55	Earth fault and Grid failure	668.05
01.04.2007 - 30.04.2007	92.11	Earth fault	623.49
01.05.2007 - 31.05.2007	306.4	Earth fault	414.56
01.06.2007 - 30.06.2007	84.28	Earth fault	636.32
01.07.2007 - 31.07.2007	21.03	Rostering	698.57
01.08.2007 - 31.08.2007	42.51	Earth fault	677.09
01.09.2007 - 30.09.2007	41.51	Earth fault	678.09
01.10.2007 - 31.10.2007	16.05	Under Voltage	703.55
01.11.2007 - 30.11.2007	10.59	Earth fault and Under Voltage	709.01
01.12.2007 - 31.12.2007	34.55	Under Voltage	709.05
2008			
01.01.2008 - 31.01.2008	22.26	Under Voltage	697.34
01.02.2008 - 29.02.2008	28.55	Under Voltage	691.05
01.03.2008 - 31.03.2008	76.55	Under Voltage	643.05
01.04.2008 - 30.04.2008	101.44	Earth fault	618.16
01.05.2008 - 31.05.2008	75.29	Earth fault	644.31

01.06.2008 - 30.06.2008	73.07	Breaking of transmission line and Under Voltage	646.53
01.07.2008 - 31.07.2008	63.56	Under Voltage	656.04
01.08.2008 - 31.08.2008	186.13	Breaking of 33 KV transmission line	533.57
01.09.2008 - 30.09.2008	29.58	Earth fault	690.02
01.10.2008 - 31.10.2008	50.18	Earth fault	669.42
01.11.2008 - 30.11.2008	34.32	Earth fault	685.28
01.12.2008 - 31.12.2008	17.30	Earth fault and Under Voltage	702.57
2009			
01.01.2009 - 31.01.2009	36.08	Earth fault	683.52
01.02.2009 - 28.02.2009	27.00	Earth fault	693.00
01.03.2009 - 31.03.2009	40.35	Earth fault	679.25
01.04.2009 - 30.04.2009	93.58	Earth fault	627.02
01.05.2009 - 31.05.2009	90.33	Earth fault	629.27
01.06.2009 - 30.06.2009	121.46	Under Voltage	598.14
01.07.2009 - 31.07.2009	99.25	33 KV shutdown by UPCL	620.35
01.08.2009 - 31.08.2009	53.06	Breaking of 33KV transmission line	666.54

01.09.2009 - 30.09.2009	14.12	Earth fault	705.48
01.10.2009 - 31.10.2009	41.47	Under Voltage	678.13
01.11.2009 - 30.11.2009	17.16	Under Voltage	702.14
01.12.2009 - 31.12.2009	20.58	Earth fault	699.02
2010			
01.01.2010 - 31.01.2010	93.54	Earth fault	626.06
01.02.2010 - 28.02.2010	17.48	Earth fault	702.02
01.03.2010 - 31.03.2010	7.41	Under Voltage	712.19
01.04.2010 - 30.04.2010	112.45	Earth fault	607.15
01.05.2010 - 31.05.2010	-----	Shut down due to maintenance in desilting tank's wall	-----
01.06.2010 - 30.06.2010	-----	Shut down due to maintenance in desilting tank's wall	-----
01.07.2010 - 31.07.2010	10.50	Earth fault	181.50
01.08.2010 - 31.08.2010	86.43	Earth fault	634.17
01.09.2010 - 30.09.2010	422.09	Earth fault	297.51
01.10.2010 - 31.10.2010	74.39	Earth fault	645.21

01.11.2010 - 30.11.2010	33.20	Earth fault	688.58
01.12.2010 - 31.12.2010	26.30	Under Voltage	693.57

Annexure 3

Table1: Documents provided by the project participant

Reference	Document
/CAL/	1. Calibration certificate of the both main meter and check meter form Uttarakhand Power Corporation Limited, the test was conducted on 2011-02-14 while the certificate is dated 2011-02-15, certificate no. 607/ETD(R)/DDN/C-4.
/CC/	Commissioning Certificate of turbines and generators involved in the project activity. **a.** Phase I i.e.1.5 X 2 MW dated 24/03/2005 b. Phase II i.e. 1.95 MW dated 19/04/2008
/CT/	Competency certificates and training records for the personnel carrying out monitoring
/CON/	The signed contract between TUV NORD CERT GmbH and Regency Aquaelectro & Motelresorts Ltd. for carrying out verification of voluntary emission reduction dated 17/11/2008.
/JMR/	Monthly electricity generation certificates by UPCL (JMR) & Invoices against JMR for the monitoring period 01/04/2006 to 31/03/2010 (including both days)
/GFR/	Grid Failure Register
/LOG/	Daily log sheet for Unit 1 (2x1.5 MW) Daily Log sheet for Unit 2 (1.95MW) HSD Log book
/MR1/	Monitoring Report “Hanuman Ganga Hydro (4.95 MW) Plant at Uttarakhand”, draft version 01 dated 10/03/2010
/MR2/	Monitoring Report “Hanuman Ganga Hydro (4.95 MW) Plant at Uttarakhand”, final

Reference	Document
	version dated 2011-03-08(VCS 3 Format)
/**MR3.1**/	Monitoring Report "Hanuman Ganga Hydro (4.95 MW) Plant at Uttarakhand", version 3.1 dated 2012-05-08(VCS 3 Format)
/**MR3.2**/	Monitoring Report "Hanuman Ganga Hydro (4.95 MW) Plant at Uttarakhand", final version 3.2 dated 2012-05-30(VCS 3 Format)
/**ORG**/	Organization Chart for monitoring roles
/**PPA**/	Power purchase agreement dated 30/01/2003 signed between RAML and UPCL
/**TD**/	Technical data sheets for 1. 1.5 X 2 MW Turbine Generator Set 2. 1.95 MW Turbine Generator Set
/**VAL**/	Validation Report under VCS version 2007.1 dated 18/11/2009 for the project activity "Hanuman Ganga Hydro (4.95 MW) Plant at Uttarakhand"
/**VCS PD**/	VCS Project Description under VCS version 2007.1 dated 15/11/2009 for the project activity "Hanuman Ganga Hydro (4.95 MW) Plant at Uttarakhand"
/**XLS**/	Excel – Calculation sheets (baseline and emission reduction calculation) provided by the project participant 1. draft version related to draft MR 2. final version related to final MR

Table2: DOE background investigation and assessment documents

Reference	Document
/**AMS I.D.**/	Grid Connected renewable electricity generation, version 16
/**CPM**/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/**IPCC-GP**/	IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2006
/**IPPC-RM**/	1. Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual 2. IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2006
/**KP**/	Kyoto Protocol (1997)
/**MA**/	Decision 17/CP.7 (Marrakech Accords)
/**VCS**/	• The Voluntary Carbon Standard Version 03 • The Voluntary Carbon Standard 2007.1 • The Voluntary Carbon Standard 2007 • The Voluntary Carbon Standard (Version 1)
/**VVM**/	CDM Validation and Verification Manual, version 01.2, Annex 1, EB 55.

Table3: Website referred during the verification process

Reference	Link	Organisation
/**cea**/	http://www.cea.nic.in	Central Electricity Authority, India
/**cerc**/	http://cercind.gov.in/	Central Electricity Regulatory Commission
/**ieta**/	http://www.ieta.org	International Emissions Trading Association
/**imp**/	http://www.powermin.nic.in	Indian Ministry of Power

/**mnes**/	http://www.mnes.nic.in	Ministry of non-conventional energy sources
/**moef**/	http://cdm.unfccc.int	Ministry of Environment and Forests.
/**unfccc**/	http://www.uerc.in	UNFCCC-CDM
/**uerc**/	http://www.upcl.org	Uttarakhand Electricity Regulatory Commission
/**upcl**/	http://www.upcl.org	Uttarakhand Power Corporation Limited
/**vcs**/	http://www.v-c-s.org	VCS Website